K. J. Somaiya Institute of Technology, Sion, Mumbai-22
(Autonomous College Affiliated to University of Mumbai)

	May-June 2025 Program: B. Tech. Scheme: II Regular Examination: LY Semester: VIII Course Code: CEDLC8024 and Course Name: Deep Learning
Date of Exam: 21/05/2025	Duration: 02.5 Hours Max. Marks: 60

Instructions:
(1) All questions are compulsory.
(2) Draw neat diagrams wherever applicable.
(3) Assume suitable data, if necessary.

Q. No.	Question	Max. Marks	CO	BT level
Q. 1	**Solve any two questions out of three: (05 marks each)**	10		
a)	Draw labeled diagram of Gated RNN(GRU) and explain.		CO5	U
b)	What is the role of optimization in Deep learning. Explain the following optimizers: 1) AdaGrad 2) Adam		CO3	U
c)	Describe the challenges in neural network optimization.		CO3	U
Q. 2	**Solve any two questions out of three: (05 marks each)**	10		
a)	Consider the feature map given below. 	0.77	-0.11	0.11	0.33	0.55	-0.11	0.33
-0.11	1.0	-0.11	0.33	-0.11	0.11	-0.11
0.11	-0.11	1.0	-0.33	0.11	-0.11	0.55
0.33	0.33	-0.33	0.55	-0.33	0.33	0.33
0.55	-0.11	0.11	-0.33	1.00	-0.11	0.11
-0.11	0.11	-0.11	0.33	-0.11	1.00	-0.11
0.33	-0.11	0.55	0.33	0.11	-0.11	0.77 | Apply Relu activation function on the given matrix and calculate resultant matrix M1. Next apply Max pooling operation with size 2*2 on the calculated matrix M1 to compute matrix M2.		CO4	Ap
b)	Describe the role of the encoder and decoder in a sequence-to-sequence model.		CO5	U
c)	Explain VGG 16 architecture in detail.		CO4	U

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Q.3	**Solve any two questions out of three. (10 marks each)**	20		
a)	i) Describe generalized delta learning rule with suitable example. (5 mk) ii) Compare ReLU and Leaky ReLU activation functions. (5 mk)		CO2	U
b)	i) Design the Logical AND gate perceptron training rule. W1=1.2 w=0.6 Threshold=1 and learning rate n=0.5 (5 mk) ii) Explain Three classes of deep learning (5mk)		CO1	Ap, U
c)	Write a short note on 1.Generative adversarial network (GAN) (5mk) 2. Denoising Autoencoders, Sparse Autoencoders (5 mk)		CO6	U
Q.4	**Solve any two questions out of three. (10 marks each)**	20		
a)	A hospital provides a dataset of 10,000 gray scale chest X-ray images labeled with 3 disease categories and one "normal" class. Explain the following for given problem statement 1. Design neural network architecture diagram tailored to this problem. 2. Activation function in hidden layer and output layer 3. Hyperparameters		CO4	Ap
b)	Draw and explain the Long Short-Term Memory networks (LSTM) and Gated RNN (GRU). List various applications of these techniques.		CO5	U
c)	Explain need of Regularization and various regularization methods with suitable examples, mathematical models etc.		CO3	U

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